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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/795,952	03/08/2004	Takashi Komura	TOW-066	1413

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EXAMINER	
CHUO, TONY SHENG HSIANG	
ART UNIT	PAPER NUMBER
1745	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/795,952	KOMURA ET AL.	
	Examiner	Art Unit	
	Tony Chuo	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) *10 and 11* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,12 and 13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/9/07 has been entered.

Response to Amendment

2. Claims 1-13 are currently pending. Claims 10 and 11 are withdrawn from further consideration as being drawn to a non-elected invention. Claim 14 has been cancelled. The previously stated 112 rejections for claims 7 and 13 are withdrawn. The amended claims do overcome the previously stated 103 rejections. However, upon further considerations, claims 1-9, 12, and 13 are rejected under the following new 112 and 103 rejections.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 7-9 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which

was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The limitations "first reinforcing film that is in physical contact with the first electrically conductive gas diffusion layer" and "second reinforcing film that is in physical contact with the second electrically conductive gas diffusion layer" are not supported by the specification.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Badding et al (US 2004/0028975) in view of Narayanan et al (US 6680139). The Badding reference discloses fuel cell "200" comprising: a series of electrochemical cells "202" wherein each electrochemical cell includes an anode electrode "210", a cathode electrode "212", and an electrolyte "208" in between the anode and cathode; a first electrically conductive film "205a" that is disposed between a pair of adjacent electrochemical cells "202" and is not stacked on either of the adjacent electrochemical cells wherein the first electrically conductive film is electrically connected to the anode of one of the adjacent electrochemical cell and extending in parallel to the anode; and a second electrically conductive film "205b" that is disposed between a pair of adjacent

electrochemical cells "202" and is not stacked on either of the adjacent electrochemical cells wherein the first electrically conductive film is electrically connected to the cathode of the other of the adjacent electrochemical cell and extending in parallel to the cathode, wherein the first electrically conductive film or the second electrically conductive film has an expansion between the adjacent electrochemical cells for connecting the first electrically conductive film and the second electrically conductive film, and wherein a portion of the electrolyte of the pair of electrochemical cells is sandwiched between the first and second electrically conductive films (See paragraph [0040]). It also discloses the first electrically conductive film "205a" that is arranged in a substantially same plane with the gas diffusion layer "222" of the anode "210" and the second electrically conductive film "205b" that is arranged in a substantially same plane with the gas diffusion layer "226" of the cathode "212" (See Figure 3).

However, Badding et al does not expressly teach a porous insulating film wherein a plurality of power generating unit is positioned on top of the porous insulating film. The Narayanan reference discloses a porous insulating film "120" wherein a plurality of fuel cell elements "97","98","99" are positioned on top of the porous insulating film (See Figure 1B).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Badding fuel cell to include a porous insulating film wherein a plurality of power generating unit is positioned on top of the porous insulating film in order to provide a substrate for supporting the electrochemical cells.

7. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Badding et al (US 2004/0028975) in view of Narayanan et al (US 6680139) as applied to claim 1 above, and further in view of Winsel et al (US 3770509). However, the Badding et al as modified by Narayanan does not expressly teach a first or second electrically conductive film that is made of a resin and an electrically conductive material. The Winsel reference discloses electrically connecting two gas diffusion layers with an electrically conductive resin comprising a plastic base material and a metal or graphite power (See column 3, line 63 to column 4, line 4). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Badding/Narayanan fuel cell to include either a first or second electrically conductive film that is made of an electrically conductive resin in order to utilize a material that has high adhesive strength, electrical conductivity, and plastic flow.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Badding et al (US 2004/0028975) in view of Narayanan et al (US 6680139) as applied to claim 1 above, and further in view of Maeda et al (JP 2003-197225). However, the Badding et al as modified by Narayanan does not expressly teach a film having windows that is laminated on the porous insulating film such that at least one of the first and second electrodes of the power generating units are disposed in the windows. The Maeda reference discloses an insulating film "120" that has windows wherein the unit cells are disposed in the windows (See Drawing 4(a)). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Badding/Narayanan fuel cell to include a film having windows that is laminated on the porous insulating film such that at least one of the first and second electrodes of the

power generating units are disposed in the windows in order to provide an additional layer for supporting the electrochemical cells.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Badding et al (US 2004/0028975) in view of Narayanan et al (US 6680139) as applied to claim 1 above, and further in view of Nishiumi et al (US 2002/0187382). However, Badding et al as modified by Narayanan et al does not expressly teach a reactant gas supply passage and a reactant gas discharge passage that extends through an end of the fuel cell. The Nishiumi reference discloses a reactant gas supply passage "228" and a reactant gas discharge passage "229" that extend through an end of the fuel cell (See Figures 4 and paragraph [0048]). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Badding/Narayanan fuel cell to include a reactant gas supply passage and a reactant gas discharge passage that extend through an end of the fuel cell in order to able to supply and discharge the electrochemical cells with reactant gases.

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narayanan et al (US 6680139) in view of Kuroki et al (US 2003/0104262). The Narayanan reference discloses a plurality of membrane electrode assemblies "97","98","99", each comprising: an anode "104" and a cathode "103" wherein each anode and cathode includes a gas diffusion backing layer and a catalyst layer stacked together; wherein the first end of the first gas diffusion layer of cathode "103" of MEA "97" protrudes toward MEA "98" and the second end of the second gas diffusion layer of anode "104" of MEA "98" protrudes toward MEA "97"; and wherein the first end and the second end are electrically connected with each other by an interconnect "135"

extending through at least the electrolyte (See column 2, lines 12-15, column 2 lines 65 to column 3 line 5, and Figure 1B).

However, Narayanan et al does not expressly teach a first end of the first electrically conductive gas diffusion layer that extends beyond a first end of the first catalyst layer; a second end of the second electrically conductive gas diffusion layer that extends beyond a second end of the second catalyst layer; a first reinforcing film that is in physical contact with and interposed between the electrolyte and the first end of the first electrically conductive gas diffusion layer of the first electrode wherein the reinforcing film is separate from the first catalyst layer; and a second reinforcing film that is in physical contact with and interposed between the electrolyte and the second end of the second electrically conductive gas diffusion layer of the second electrode wherein the second reinforcing film is separate from the second catalyst layer. The Kuroki reference discloses the first end of the first gas diffusion layers "15" that extends beyond the first end of the first catalyst layer "13"; a second end of the second gas diffusion layer "16" that extend beyond the second end of the second catalyst layer "14"; a first reinforcing seal gasket "20" that is in physical contact with and interposed between the electrolyte "12" and first end of the first electrically conductive gas diffusion layer "15" of the first electrode wherein the reinforcing seal gasket is separate from the first catalyst layer "13"; and a second reinforcing seal gasket "21b" that is in physical contact with and interposed between the electrolyte "12" and the second end of the second electrically conductive gas diffusion layer "16" of the second electrode wherein the second reinforcing seal gasket is separate from the second catalyst layer "14" (See Figure 8 and paragraph [0144],[0145]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Narayanan fuel cell to include a first end of the first electrically conductive gas diffusion layer that extends beyond a first end of the first catalyst layer; a second end of the second electrically conductive gas diffusion layer that extends beyond a second end of the second catalyst layer; a first reinforcing film that is in physical contact with and interposed between the electrolyte and the first end of the first electrically conductive gas diffusion layer of the first electrode wherein the reinforcing film is separate from the first catalyst layer; and a second reinforcing film that is in physical contact with and interposed between the electrolyte and the second end of the second electrically conductive gas diffusion layer of the second electrode wherein the second reinforcing film is separate from the second catalyst layer in order to improve the seal between the first and second gas diffusion layers.

11. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narayanan et al (US 6680139) in view of Kuroki et al (US 2003/0104262) as applied to claim 7 above; and further in view of Badding et al (US 2004/0028975). In addition, the Narayanan reference also discloses first electrically conductive gas diffusion layer of the first electrode of the first power generation unit "97" and the second electrically conductive gas diffusion layer of the second electrode of the second power generation unit "98" that have overlapping portions with the electrolyte interposed between the overlapping portions and are electrically connected together by the interconnect "135" (See Figure 1B). However, Narayanan et al as modified by Kuroki et al does not expressly teach an electrically conductive member that is an electrically conductive rivet member. The Badding reference discloses a fill material "203" that is an electrically

conductive rivet member (See paragraph [0040] and Figure 2B). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Narayanan/Kuroki fuel cell to include an electrically conductive member that is an electrically conductive rivet member in order to further strengthen the electrical connection between the first and second gas diffusion layers.

12. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narayanan et al (US 6680139) in view of Kuroki et al (US 2003/0104262) as applied to claim 7 above, and further in view of Jansing et al (US 5942348). In addition, the Narayanan reference also discloses an electrolyte "115" that is an electrolyte membrane; and power generation units "97","98","99" that are arranged in the same plane to form an MEA unit (See column 2, lines 6-7 and Figure 1B). However, Narayanan et al as modified by Kuroki et al does not expressly teach a first and second electrically insulating separators for sandwiching the MEA unit; a fuel gas flow field facing the power generation units that is provided on the first electrically insulating separator; and an oxygen containing gas flow field facing the power generation units that is provided on the second electrically insulating separator. The Jansing reference discloses a first electrically insulating bipolar plate "30" and a second electrically insulating bipolar plate "30'" that sandwich the MEA "43"; oxygen gas grooves "31" facing the MEA "43" that is provided on the first electrically insulating bipolar plate; and hydrogen gas grooves "31'" facing the MEA "43" that is provided on the second electrically insulating bipolar plate (See column 8, lines 8-16 and Figure 3). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Narayanan/Kuroki fuel cell to include a first and second electrically

insulating separators for sandwiching the MEA unit; a fuel gas flow field facing the power generation units that is provided on the first electrically insulating separator; and an oxygen containing gas flow field facing the power generation units that is provided on the second electrically insulating separator in order to prevent an electrical short circuit between the power generation units and to be able to supply reaction gases to the membrane electrode assemblies.

13. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Badding et al (US 2004/0028975) in view of Jansing et al (US 5942348), Nishiumi et al (US 2002/0187382), and Richards (US 5547777). The Badding reference discloses a plurality of fuel cells "200" wherein each fuel cell includes a plurality of power generation units arranged in the same plane and wherein each power generation unit includes a first electrode, a second electrode, and an electrolyte interposed between the first and second electrode (See Figure 2A). However, Badding et al does not expressly teach a pair of electrically insulating separators for sandwiching the power generation units. The Jansing reference discloses a first electrically insulating bipolar plate "30" and a second electrically insulating bipolar plate "30"" that sandwich the MEA "43" (See column 8, lines 8-16 and Figure 3). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Badding fuel cell to include a first and second electrically insulating separators for sandwiching the MEA unit in order to prevent an electrical short circuit between the power generation units.

However, Badding et al as modified by Jansing et al does not expressly teach a plurality of guide grooves that are formed on at least one of the separators on the

surface opposite to a surface facing the power generation units for supplying a coolant along the separator; a reactant gas supply passage and a reactant gas discharge passage that extend through the fuel cells in a stacking direction of the fuel cells; and a seal member provided on the at least one of the separators on the surface opposite to the surface facing the power generation units wherein the seal member separates the reactant gas supply passage and the reactant gas discharge passage from the coolant passage. The Nishiumi reference discloses a cooling water passages "226" that are formed on at least one of the separator "218" on a surface opposite to a surface facing the membrane electrode assembly for supplying a coolant along the separator; a reactant gas supply passage "231" and a reactant gas discharge passage "231" that extend through the fuel cells in a stacking direction of the fuel cells; and a gasket provided on the at least one of the separators on the surface opposite to the surface facing the power generation units wherein the seal member separates the reactant gas supply passage and the reactant gas discharge passage from the coolant passage (See paragraph [0048],[0060] and Figures 4 and 5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Badding/Jansing fuel cell to include a plurality of guide grooves that are formed on at least one of the separators on the surface opposite to a surface facing the power generation units for supplying a coolant along the separator; a reactant gas supply passage and a reactant gas discharge passage that extend through the fuel cells in a stacking direction of the fuel cells; and a seal member provided on the at least one of the separators on the surface opposite to the surface facing the power generation units wherein the seal member separates the

reactant gas supply passage and the reactant gas discharge passage from the coolant passage in order to regulate the temperature of the fuel cell and to simplify the structure by providing internal common manifolds for supplying and discharging the reactant gases.

However, Badding et al as modified by Jansing et al and Nishiumi et al does not expressly teach a casing containing the fuel cells; and a coolant passage formed in a spacing between the casing and the plurality of fuel cells so that the coolant flows along a surface of the casing wherein the coolant passage is connected to the guide grooves of each of the fuel cells in the casing. The Richards reference discloses a cooling jacket "27" formed in a space between the housing "20" and the fuel cells "10" so that the coolant flows along a surface of the housing (See column 17, lines 26-30, column 18, lines 34-36, and Figure 8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Badding/Jansing/Nishiumi fuel cell to include a casing containing the fuel cells; and a coolant passage formed in a spacing between the casing and the plurality of fuel cells so that the coolant flows along a surface of the casing wherein the coolant passage is connected to the guide grooves of each of the fuel cells in the casing in order to simplify the structure by using the space between the housing and the fuel cells as an internal manifold for distributing the coolant.

14. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Badding et al (US 2004/0028975) in view of Jansing et al (US 5942348), Nishiumi et al (US 2002/0187382), and Richards (US 5547777) as applied to claim 12 above, and further in view of Ide et al (JP 63-279578). However, Badding et al as modified by Jansing et

al, Nishiumi et al, and Richards does not expressly teach a seal member that extends along an entire width of the at least one of the separators on the surface opposite to the surface facing the power generation units wherein the sealing member includes a bent portion that extends along a side surface of the at least one of the separators wherein the bent portion is interposed between the casing and the side surface of the at least one of the separators. The Ide reference discloses a gas separator "1" that includes a seal member "4" member that extends along an entire width of the at least one of the separators on the surface opposite to the surface facing the power generation units and a bent portion "6" that extends along a side surface of the at least one of the separators wherein the bent portion is interposed between the casing "5" and the side surface of the at least one of the separators "1" (See Abstract and Drawings 6 and 7). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Badding/Jansing/Nishiumi/Richards fuel cell to include a seal member that extends along an entire width of the at least one of the separators on the surface opposite to the surface facing the power generation units wherein the sealing member includes a bent portion that extends along a side surface of the at least one of the separators wherein the bent portion is interposed between the casing and the side surface of the at least one of the separators in order to improve the seal between the casing and the fuel cells.

Response to Arguments

15. Applicant's arguments with respect to claims 1-9, 12, and 13 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571) 272-0717. The examiner can normally be reached on M-F, 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's trainer, Susy Tsang-Foster can be reached on (571) 272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC

Susy Tsang Foster
Primary Examiner